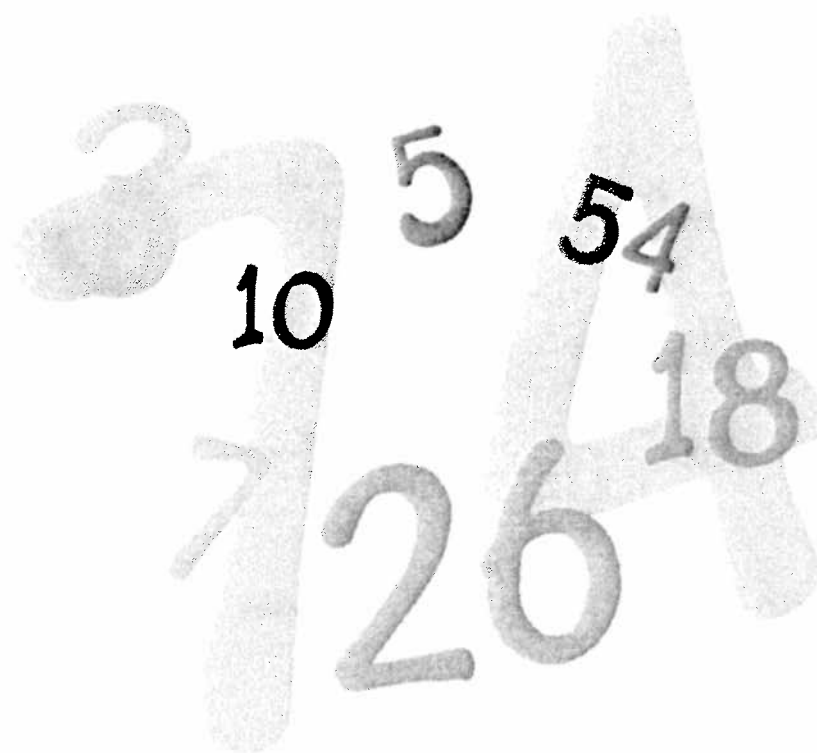


# Algebra Series

## Exam Review



**2014 - 2015**

**Directions:** Solve each problem. Show all work. Mark your answers on the Scranton sheet.

1. Evaluate  $\sqrt{4a^2 - 44} + \sqrt[3]{b}$  where  $a = 6$  and  $b = 64$ ?

$$\sqrt{4(6)^2 - 44} + \sqrt[3]{64}$$

2. The weight, in pounds, of a wheelbarrow containing  $b$  bricks is given by the expression  $60 + 5b$ . What is the total weight of the wheelbarrow when it holds 30 bricks?

$$60 + 5(30)$$

210 pounds

3. Translate the following into an algebraic expression: "the cube root of  $a$  and  $b$ , less seven"?

$$\sqrt[3]{ab} - 7$$

4. What is the value of the expression  $xy^2 + 6y$ , if  $x = 3$  and  $y = -4$ ?

$$3(-4)^2 + 6(-4)$$

$$3 \cdot 16 - 24 = 24$$

5. Express  $\sqrt{180}$  in simplest radical form?

$$6\sqrt{5}$$

$$\begin{array}{r} 2 \overline{) 180} \\ \underline{2} \phantom{0} \\ 0 \phantom{0} \\ \underline{0} \phantom{0} \\ 0 \phantom{0} \\ \underline{0} \phantom{0} \\ 0 \end{array}$$

6. Simplify:  $\sqrt[3]{81}$

$$\begin{array}{r} 3 \overline{) 81} \\ \underline{3} \phantom{0} \\ 0 \phantom{0} \\ \underline{0} \phantom{0} \\ 0 \end{array} \quad 3\sqrt[3]{3}$$

7. Simplify:  $\sqrt[3]{128}$

$$4\sqrt[3]{2}$$

$$\begin{array}{r} 2 \overline{) 128} \\ \underline{2} \phantom{0} \\ 0 \phantom{0} \\ \underline{0} \phantom{0} \\ 0 \phantom{0} \\ \underline{0} \phantom{0} \\ 0 \end{array}$$

8. Which could be the first step in order to solve the equation below for  $b_1$ ?

$$A = \frac{1}{3}hf(b_1 + b_2)$$

Multiply by 3

9. The formula for the volume of a pyramid is  $V = \frac{1}{3}bh$ . Which equation solves the formula for  $h$ ?

a.  $3Vb$

b.  $h = \frac{3b}{V}$

c.  $h = \frac{3V}{b}$

d.  $h = \frac{V}{3b}$

$$(3)V = \frac{3}{3}bh$$

$$\frac{3V}{b} = \frac{bh}{b}$$

$$h = \frac{3V}{b}$$

10. Write the name of the property that justifies the work being done at step 2.

$$-3(x + 4) = 18$$

STEP 1: Distributive Property

$$-3x - 12 = 18$$

$$\begin{array}{r} +12 \quad +12 \\ \hline -3x \quad = \quad 30 \\ -3 \quad = \quad 3 \end{array}$$

STEP 2:

STEP 3: Division Property of Equality

$$x = -10$$

a. Subtraction Property of Equation

b. Associative Property over Addition

c. Addition Property of Equality

d. Commutative Property over Addition

11. What is the solution of the following equation?

$$-4(x + 3) + 8 = 2(x + 4)$$

a. -6

b. -2

c. 2

d. 6

12. Solve:  $-4 + 5(x - 2) = -13 + 5x$  no solution

13. Identify the property that justifies the work between Step 2 and Step 3.

Step 1:  $-8 = -3(x - 5)$

Step 2:  $-8 = -3x + 15$

Step 3:  $-8 - 15 = -3x + 15 - 15$  Subtraction Property

Step 4:  $-23 = -3x$

Step 5:  $\left(-\frac{1}{3}\right)(-23) = \left(-\frac{1}{3}\right)(-3x)$

Step 6:  $\left(\frac{23}{3}\right) = x$

14. Which equation best describes the graph of the line shown below:

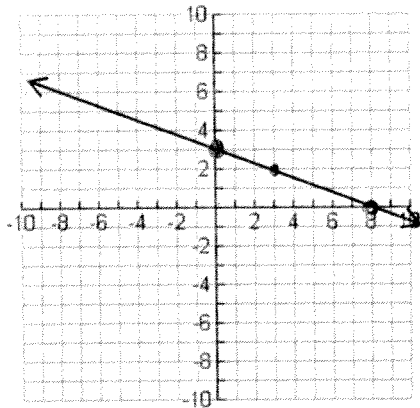
$$\begin{array}{r} -4x - 12 + 8 = 2x + 8 \\ -4x - 4 = 2x + 8 \\ \underline{-2x \quad -2x} \\ -6x - 4 = 8 \\ \underline{+4 \quad +4} \\ -6x = 12 \\ \underline{-6 \quad -6} \\ x = -2 \end{array}$$

$$\begin{array}{r} \textcircled{!!} -4 + 5x - 10 = -13 + 5 \\ -14 + 5x = -13 + 5 \\ \underline{-5x \quad -5} \\ -14 = -13 \\ \text{no solution} \end{array}$$

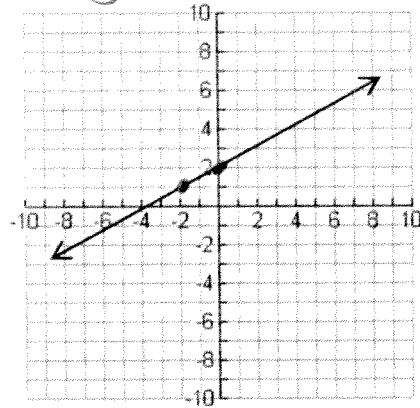
$$y = -\frac{3}{8}x + 3$$
~~$$y = -\frac{1}{3}x + 3$$~~

$$y = \frac{1}{2}x + 2$$

a.



b.



15. What is the slope of the line represented by the following equation?

$$3y - 5 = 4x$$

$$\begin{array}{r} 3y - 5 = 4x \\ +5 \quad +5 \\ \hline 3y = 4x + 5 \\ \frac{3y}{3} = \frac{4x}{3} + \frac{5}{3} \end{array}$$

$$y = \frac{4}{3}x + \frac{5}{3}$$

$$m = \frac{4}{3}$$

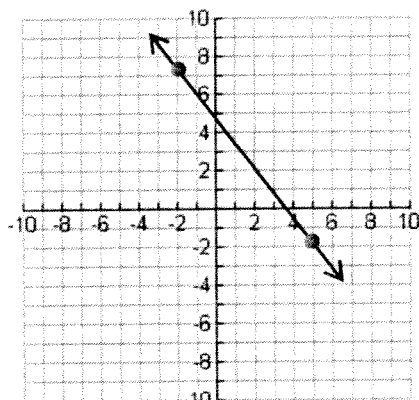
16. What is the slope of a line that passes through the points?

$(-1, 0)$  and  $(5, 8)$ ?

$$m = \frac{8 - 0}{5 - (-1)} = \frac{8}{6} = \frac{4}{3}$$

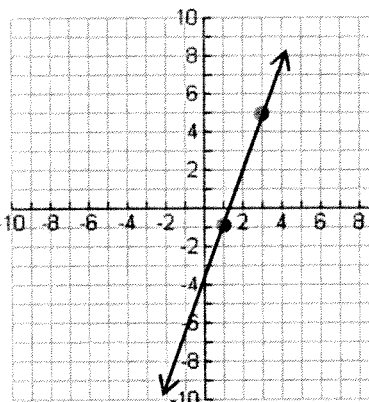
17. Which best describes the slope of each line whose graph is shown?

a.



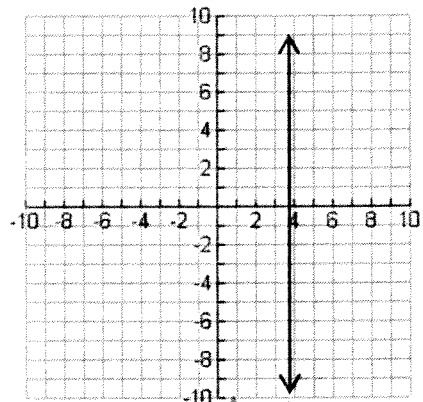
neg

b.



pos

c.



undefined

18. Which is the equation of a line with a slope of -3 that passes through the point:  $(-5, 8)$ ;

$$y = -3x - 7$$

$$\begin{array}{r} y = mx + b \\ 8 = -3(-5) + b \\ 8 = 15 + b \quad -7 = b \\ -15 \quad -15 \end{array}$$

19. Which best describes the transformation that changes the graph of the line  $y = -2x - 5$  to  $y = -2x + 5$ ?

shifts up 10 units

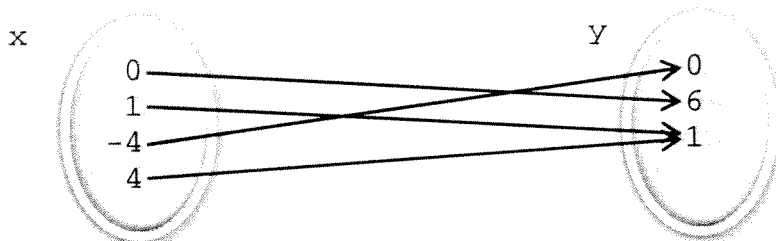
20. Which of the following sets of ordered pairs is a function?

- a.  $\{(2,1), (2,2), (3,4), (5,6)\}$
- b.  $\{(-2,-1), (1,2), (3,4), (1,5)\}$
- c.  $\{(1,2), (2,2), (3,3), (2,4)\}$
- d.  $\{(1,1), (2,1), (3,2), (4,4)\}$

21. If  $f(x) = x^2 + 3x + 5$ , what is the value of  $f(x)$  when  $x = -5$ ?

$$\begin{aligned} &= (-5)^2 + 3(-5) + 5 \\ &= 25 - 15 + 5 \\ &= 15 \end{aligned}$$

22. Which of the following is the range of the function represented below?



$\{0, 6, 1\}$

23. Given the x-intercept of  $-2$  and the y-intercept of  $7$ , write an equation in slope-intercept form.

$(-2, 0)$        $(0, 7)$        $\frac{7}{2}$

$$\begin{aligned} 7 &= \frac{7}{2}(0) + b \\ 7 &= b \end{aligned}$$

$$\boxed{y = \frac{7}{2}x + 7}$$

24. **a** varies directly as **b** and the constant of variation is  $\frac{1}{4}$ . Which equation represents the relationship?

a.  $a = \frac{1}{4}b$

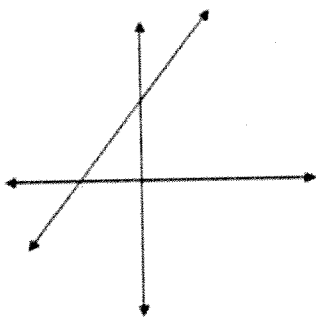
b.  $a = 4b$

c.  $a = b + \frac{1}{4}$

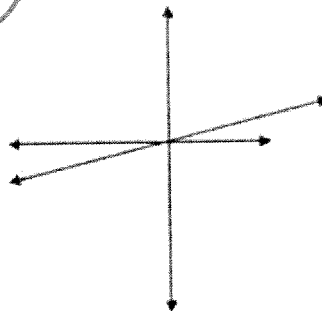
d.  $a = b - \frac{1}{4}$

25. Which graph represents a direct variation?

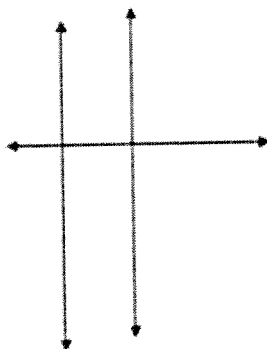
a.



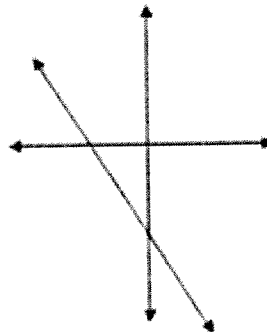
c.



b.



d.



26. Suppose **t** varies directly as **c**. Write a direct variation equation that relates **t** and **c**.

$$t = kc$$

27. Is the equation  $2(2x + 4) = -10$  equivalent to  $4x + 8 = -10$ ? yes

Are the equations equivalent? If so, which property?

yes

distributive

prop

28. Using  $3x - 4(2x + 4) = 5x$ , complete the following:

$$\boxed{-5x - 16} = 5x$$

$$\begin{array}{r} 3x - 8x - 16 \\ -5x - 16 \end{array}$$

29. Write an equation that is equivalent to:

$$3(5 - 4x) = 5 - 4(1 - 2x)$$

$$15 - 12x = 5 - 4 + 8x$$

30. The total cost (c) in dollars of renting a sailboat for n days is given by the equation  $c = 130 + 40n$ . If the total cost was \$330.00, for how many days was the sailboat rented?

$$\begin{array}{r} 330 = 130 + 40n \\ -130 \quad -130 \\ \hline 200 = 40n \\ \underline{40} \quad \underline{40} \\ 5 = n \end{array}$$

31. Evaluate  $-2|x+2|$  when  $x = -4$ .

$$\begin{array}{r} -2|-4+2| \quad -2 \cdot 2 \\ -2|-2| \quad \boxed{-4} \end{array}$$

32. What is the equation of the line that has a slope of  $\frac{2}{3}$  and

passes through the point  $(2, -6)$ . Write the equation in standard form.

standard form

$$3y = \frac{2}{3}x - \frac{22}{3}$$

$$3y = 2x - 22$$

$$-2x + 3y = -22$$

$$\begin{array}{r} y = mx + b \\ -6 = \frac{2}{3} + b \\ b = -\frac{22}{3} \end{array}$$

$$\boxed{y = \frac{2}{3}x - \frac{22}{3}}$$

What are the x-intercept and y-intercept of the graph of  $3x + 4y = 24$ ?

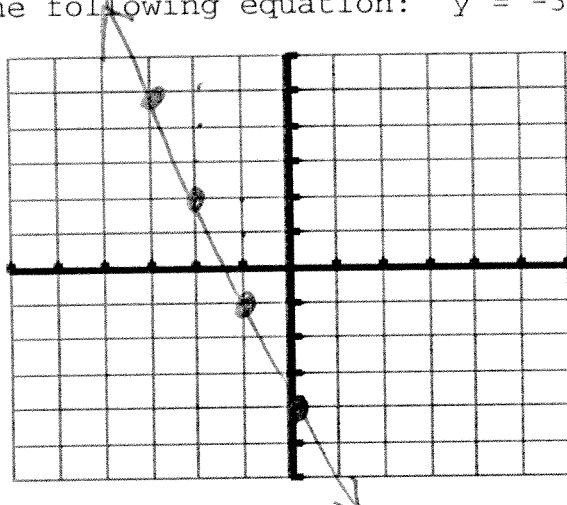
$$x\text{-int} = 8$$

$$y\text{-int} = 6$$

34. The relation  $\{(2, 5), (3, 6), (4, 8), (5, 6)\}$ , is it a function?

yes

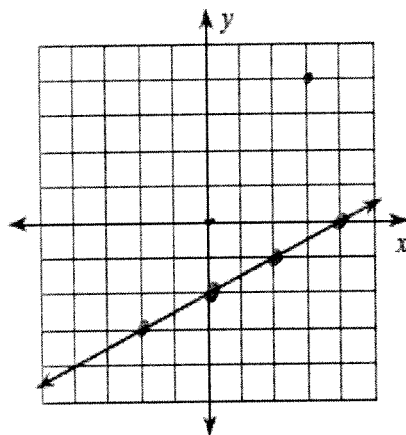
35. Graph the following equation:  $y = -3x - 4$



36. Does the point  $(5, -9)$  lie on the line  $6x + 2y = 12$ ?

yes  $6(5) + 2(-9) = 12$   
 $30 + (-18) = 12$

37. Write the equation of the line for the graph below?



$$m = \frac{1}{2}$$

$$b = -2$$

$$y = \frac{1}{2}x - 2$$



38. Write an equation for the following table in slope-intercept form.

x	y
1	3
3	-3
5	-9

$$y = -3x + 6$$

39. The lengths of the sides of a triangle are  $y$ ,  $y + 2$ , and 8 centimeters. If the perimeter is 58 centimeters, what is the value of  $y$ ?

$$\begin{aligned} y + y + 2 + 8 &= 58 \\ 2y + 10 &= 58 \\ -10 \quad -10 & \end{aligned}$$

40. Simplify the radical  $\sqrt{600ab^4c^3}$ .

$$\begin{array}{r} 2 \overline{) 600} \\ \underline{9} 300 \\ 2 \overline{) 150} \\ \underline{5} 75 \\ \underline{5} 015 \end{array} \quad 10b^2c\sqrt{6ac}$$

$$\frac{2y}{2} = \frac{48}{2}$$

$$y = 24$$

41. Joe's solution to an equation is shown below.

Given:  $x + 5(x + 10) = 97$

Step 1:  $x + 5x + 10 = 97$

Step 2:  $6x + 10 = 97$

Step 3:  $6x = 97 - 10$

Step 4:  $6x = 87$

Step 5:  $\frac{6x}{6} = \frac{87}{6}$

Step 6:  $x = 14.5$

Did Joe make a mistake, if yes, at which step. If not, show your work to prove the answer.

42. Marsha just finished solving an equation and the last line of her work is  $5 = 6$ . What is the solution?

no solution

43. What is the value of  $\frac{5x-3y}{xy}$  when  $x = 2$  and  $y = -3$ ?

$$-3\frac{1}{6}$$

$$\frac{5(2) - 3(-3)}{2(-3)} = \frac{10 + 9}{-6} = \frac{19}{-6}$$

44. What is the domain of the relation shown below?

x	y
3	15
5	21
-2	0

$\{3, 5, -2\}$

45. What are the range values of the function  $f(x) = -2x^2 + 4$  for the domain values  $\{-3, 0, 1\}$ ?

$\{-14, 4, 2\}$

46. Point A(3,4) lies on a line that represents a direct variation equation. Name some other points that line on that line.

(0,0)

47. What is the value of the function  $f(x) = x^2 - 3x + 2$  when  $x = -2$ ?

$$f(x) = 12$$

48. What is the equation of a line that passes through the point (3,8) and has a slope of 0?

$$y = 8$$

HOY

49. What is the solution to the following equation?

$$\frac{2}{5}x - 6 = \frac{2}{3}x + 3$$

$$\begin{array}{r} \frac{2}{5}x - 6 = \frac{2}{3}x + 3 \\ -\frac{2}{3}x \quad -\frac{2}{3}x \\ \hline \end{array}$$

$$\begin{array}{r} -\frac{4}{15}x - 6 = 3 \quad (15) \\ +6 \quad +6 \quad \frac{4}{15}x = 9(15) \\ \hline \end{array}$$

50. The data in the table shows the cost of renting a bicycle by the hour, including a deposit.

$$\begin{array}{r} -4x = 135 \\ -4 \quad -4 \end{array}$$

**RENTING A BICYCLE**

Hours (h)	Cost in dollars (c)
2	23
5	53
8	83

$$\begin{array}{r} x = \\ -33 \frac{3}{4} \end{array}$$

If hours,  $h$ , were graphed on the horizontal axis and cost  $c$ , were graphed on the vertical axis, what would be the equation of the line that fits the data?

$$C = 10h + 3$$